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3.2.5 Pedestrian and shared use path crossings

There are several pedestrian and shared use path crossing types. Guidance related to each type of crossing is provided in this article.

The following references provide additional information related to the design of shared use paths and bicycle facilities: AASHTO's 1999 *Guide for the Development of Bicycle Facilities* [BDM 3.1.5.2]; the design guidelines (Chapter 4) in *Iowa Trails 2000* [BDM 3.1.5.2], and *SUDAS Standard Specifications* [BDM 3.1.5.2].

- **Pedestrian or shared use path on a highway structure**

Guidance for sidewalk and shared use paths on roadway bridges is covered under [BDM 3.2.6.2.2 & 2.5], and Office of Design's Design Manual [OD DM 12A].

- **Separate pedestrian or shared use path bridge**

  The following paragraphs do not apply to pedestrian or shared use paths on a highway structure. For a separate pedestrian or shared use bridge, the office recommends a minimum clear width of 12 feet (3.600 m). This is different than our recommended 10-foot (3.000-m) clear width on vehicular bridges due to the minimal increase in cost to provide 12 feet (3.600 m) on a separate bridge.

  To assist in drainage and snow removal, the maximum deck cross slope shall be 2% in one direction across the full width. Concrete parapets at the base of the fence or railing may be proposed based on aesthetics and safety concerns. Parapets also protect the fence from being damaged by snowplow blades. Such parapets require a minimum footprint of 16 inches (400 mm) (plus 2-inch (50-mm) setback from slab edge) in order to accommodate the fence/railing anchorages. If no parapet is used, 12 inches (300 mm) is a sufficient fence/railing footprint on each side. The designer shall consult with the Methods Section in the Office of Bridges & Structures regarding usage of parapets.

  For structures over a roadway, the desirable minimum vertical clearance is 17.50 feet (5.334 m). Provisions for additional clearance may be considered for unique bridges. It is undesirable to use truss bridges over our highways due to damage from over-height loads and the lack of proper fencing to prevent debris from falling/thrown onto the roadway below. A girder bridge with a concrete deck and proper fencing is preferred for recreational or trail bridges over a roadway.

  For structures over a waterway, the structure low beam should generally be designed at the Q_{10} water surface elevation. Typically, relief in the approach grading should be provided for discharges greater than the Q_{10}. Since waterway structures will be inundated by larger floods, the designer should consider the expected buoyant forces. In general, the bridge approach fill within the floodplain should be designed close to the floodplain grade. This is especially true if the construction will be within a detailed FIS area.

- **Pedestrian or shared use path under a roadway bridge**

  Adjacent to an urban roadway section, the desirable horizontal clearance from back of curb to sidewalk or shared use path is 6 feet (1.800 m) to allow for snow storage. If the offset from back of curb to shared use path is less than 5 feet (1.500 m), a separation barrier is required. Adjacent

to a rural roadway section or at a river or stream crossing, the location and offset of the pedestrian or shared used path should be coordinated with Office of Design. The desirable minimum vertical clearance is from bridge low superstructure to sidewalk or shared use path is 10 feet (3.000 m), with a minimum of 8 feet (2.400 m).

For both crossing types above, a 2-foot (600-mm) shy distance is desired from sidewalk or shared use path to bridge berm, and a 3-foot (900 mm) horizontal clearance is desired from sidewalk or shared use path to pier column.

Greater shy distance should be considered for slopes steeper than 3:1 sloping down or away. Railings or dense plantings may have to be considered alongside certain grade conditions or ground covering (such as rip rap).

- **Pedestrian or shared use path through roadway embankment**

  In most cases, a standard sized 12-foot x 10-foot (3.600-m x 3.000-m) reinforced concrete box (RCB) structure is desired. The RCB size may be larger based on site conditions. A note shall be added on the TSL that the standard frost trough on the floor of the RCB shall not be used. It is preferred that a flared-wing headwall be utilized for a path or trail.

  Use of a precast box culvert is allowed only with approval by the Preliminary Bridge Design Section Leader. The 12-foot x 10-foot (3.600-m x 3.000-m) size will be adequate in most cases, even though a 1’ x 1’ haunch will encroach in each corner. Because floor joints between precast box culvert sections are likely to exceed ½ inch in the direction of travel, precast culverts shall not be used for pedestrian underpasses unless the joints are bridged. Providing the necessary slip-resistant floor surface also may be difficult in precast culverts. If a concrete layer is proposed on the culvert floor to address these concerns, the designer may consider increasing the culvert height to 11 feet.

  Depending on the length of the structure required, the location, and concerns about pedestrian safety, tunnel-type lighting may be appropriate. If a local municipality is involved this subject should be discussed during project concept/field exam stages and the information briefly noted on the TS&L.